CLAIMS

1. A fully mixed reactor for providing activated sludge treatment of sewage as a mixed liquor which reactor includes at least one aerator operative intermittently to raise the dissolved oxygen level of the liquor and a control system which is arranged to operate the aerator to provide an operative phase including a predetermined aerobic time period after a first dissolved oxygen target level is reached, and an inoperative phase including a predetermined anoxic time period after a second, lower, dissolved oxygen target level is reached.

2. A reactor as claimed in claim 1 wherein in the operative phase the control system is arranged to vary the output of the aerator during the predetermined aerobic time period so as to maintain the dissolved oxygen level at a given set point.

3. A reactor as claimed in claim 2 wherein the given set point is higher than the first target level.

4. A reactor as claimed in claim 3 wherein the given set point is from 0.5 to 5.0 mg/L.

5. A reactor as claimed in claim 1 wherein the operative phase comprises an initial operative variable time period and then the predetermined aerobic time period and the inoperative phase comprises an initial inoperative variable time period and then the predetermined anoxic time period.

6. A reactor as claimed in claim 5 wherein the initial operative variable time period is until the first target level is reached and the initial inoperative variable time period is until the second target level is reached.

7. A reactor as claimed in claim 5 wherein the control system includes at least one override condition which is an aerobic override condition such that if the initial operative variable period is greater than a chosen multiple of the predetermined aerobic time period, the control system starts the inoperative phase.

8. A reactor as claimed in claim 5 wherein the control system includes at least one override condition which is an anoxic override condition such that if the initial inoperative variable period is greater than a chosen multiple of the predetermined anoxic time period, the control system starts the operative phase.

9. A reactor as claimed in ~~claim 7 or claim 8~~ wherein the multiple is from 2 to 10.

10. A reactor as claimed in ~~claim 7 or claim 8~~ wherein the multiple is from 3 to 6.

11. A reactor as claimed in claim 1 wherein the predetermined aerobic time period is from 15 to 120 minutes and the predetermined anoxic time period is from 0 to 60 minutes.

12. A reactor as claimed in claim 1 wherein the predetermined aerobic time period is about 20 minutes and the predetermined anoxic time period is about 5 minutes.

13. A method of controlling an aerator for a fully mixed reactor providing activated sludge treatment of sewage as a mixed liquor which method includes operating the aerator in an operative phase including a predetermined aerobic time period after a first dissolved oxygen target

level is reached, and in an inoperative phase including a predetermined anoxic time period after a second, lower, dissolved oxygen target level is reached.

14. A method as claimed in claim 13 wherein the output of the aerator is varied during the operative phase to maintain the dissolved oxygen level at or around a given set point which is higher than the first target level.

15. A method as claimed in ~~claim 13 or claim 14~~ wherein the operative phase comprises an initial operative variable time period and then the predetermined aerobic time period and the inoperative phase comprises an initial inoperative variable time period followed by the predetermined anoxic time period.

16. A method as claimed in claim 15 wherein the initial operative variable time period is until the first target level is reached and the initial inoperative variable time period is until the second target level is reached.

17. A method as claimed in claim 15 which includes overriding the operative phase to start the inoperative phase if the initial operative variable period is greater than a chosen multiple of the predetermined aerobic time period.

18. A method as claimed in claim 15 which includes overriding the inoperative phase to start the operative phase if the initial inoperative variable period of the inoperative phase is greater than a chosen multiple of the predetermined anoxic time period.

19. A method as claimed in claim 17 wherein the multiple is from 2 to 10.

20. A method as claimed in claim 17 wherein the multiple is from 3 to 6.

21. A method as claimed in claim 18 wherein the multiple is from 2 to 10.

22. A method as claimed in claim 18 wherein the multiple is from 3 to 6.